ABSTRACT OF THE INVENTION

A process is described for recovering sodium carbonate or other sodium-based chemicals from sodium-bearing streams, including in particular mine water, evaporative pond water and sodium carbonate decahydrate deposits, recycle and purge streams, and other waste streams. In the process selected sodium bicarbonate-bearing streams are decarbonized to reduce the sodium bicarbonate concentration in a combination with other sodium-bearing streams, resulting in a liquor suitable as feed to a sodium carbonate decahydrate or sodium carbonate monohydrate process. The sodium bicarbonate concentration can be reduced using any number of known processes such as reacting said sodium bicarbonate with a neutralizing agent such as calcium oxide, calcium hydroxide, sodium hydroxide, or other alkali. Sodium bicarbonate can also be stripped using steam or air. The sodium bicarbonate reduced stream is combined with other sodium-bearing streams where the concentration is adjusted to form a liquor suitable to feed a sodium decahydrate or sodium carbonate monohydrate evaporation/crystallization step. Alternatively, the decarbonized stream can be concentrated using sodium carbonate decahydrate crystals formed from said sodium carbonate decahydrate process. Additionally, waste streams dilute in sodium carbonate concentration can be heated, especially with waste process heat, and recycled to existing sodium carbonate decahydrate deposits in evaporation ponds prior to combining said stream with other waste streams, purge streams, recycle streams, or sodium decahydrate crystals with the intention of recovering sodium carbonate from such streams and deposits and further processing the resulting liquor through an evaporation/crystallization step whereby various selected sodium carbonate salts are produced. The combination of the various sodium-bearing streams is decarbonized to below 3.5% sodium bicarbonate when fed to a sodium decahydrate process and to below 1% sodium bicarbonate when fed to a sodium carbonate monhydrate process. The feed streams are adjusted in sodium carbonate concentration by higher concentrated sodium carbonate-bearing streams or by addition of sodium carbonate decahydrate produced from said streams or recovered form evaporation pond deposits, are then processed to produce sodium carbonate decahydrate or sodium carbonate monohydrate or further processed to form other sodium carbonate salts.